

engineering and constructing a better tomorrow

February 15, 2007

Ms. Beverly T. Stepter, RPM USEPA, Region 4 Waste Management Division Sam Nunn Atlanta Federal Center, 11th Floor 61 Forsyth Street S.W. 3201 Atlanta, Georgia 30303

Subject:

Preliminary Human Health Risk Screening-Soils

Henry's Knob Former Mine Site York County, South Carolina EPA ID No. SCN 000 407 376

MACTEC Project 3617-07-7106-1000

Dear Ms. Stepter:

As requested in our telephone conference call on Thursday, February 8, 2007, MACTEC Engineering and Consulting, Inc. (MACTEC), on behalf of ABB, Inc., has prepared the enclosed Human Health Risk Screening based on the laboratory analytical results of the soil samples collected during the Step 1 investigation at the subject site. We are providing you with five copies of the document.

MACTEC looks forward to working with you on this project and should you have any questions, please contact Paul S. Johnstone at (864) 288-5116.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

Eugene S. Shephard

Gusene S. Shephard

Principal Engineer

with permission

Paul S. Johnstone, P.G. Principal Geologist

Enclosure

cc: Mr. Tim Hornosky - SCDHEC, Columbia, SC (two copies)

Ms. Elaine Hammick - ABB, Inc., Windsor, CT Mr. Eugene Shephard - MACTEC, Portland, ME

Mr. Jay Peters - MACTEC, Wakefield, MA

Ms. Gwen Geidel - University of South Carolina, Columbia, SC

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MACTEC, Inc.	
MACTEC Engineering and Consulting	
MACTEC Development	

MEMORANDUM

DATE:	February 12, 2007
FROM:	Jay Peters
SUBJECT:	Human Health Risk Screening - Soil Data - Henry's Knob Former Mine Site
TO:	Elaine Hammick
COPY TO:	File

The soil data collected in support of the Remedial Investigation (RI) for the Henry's Knob Former Mine Site (Site) were compared to various screening values in the Step 1 RI Report (MACTEC, 2006) to help place perspective on the significance of the detected concentrations and to help guide future site investigation activities. This memorandum provides additional discussion concerning potential risks to human health.

Table 3A of the Step 1 RI Report presented a comparison of analytical results for soil samples collected throughout the Site to USEPA Region IX Preliminary Remediation Goals (PRGs) for residential use soil, USEPA Region IX PRGs for industrial use soil, Piedmont background soil concentrations, and site-specific background soil concentrations. Table 3A is attached to this memorandum for reference.

The USEPA Region IX PRG values are risk-based soil concentrations that are protective for exposures to analytes in soil at specified target risk levels. The residential soil PRGs are protective for young children and adults who are assumed to ingest and contact soil, and inhale soil-derived dust, during activities such as gardening and playing on the ground, 350 days per year over a 30-year period. The industrial soil PRGs are protective for adults who are assumed to ingest and contact soil, and inhale soil-derived dust, during work-day activities, 250 days per year over a 25-year period. The PRG values used for soil data comparisons in Table 3A are considered to be PRG screening values because they are based on target risks below the EPA threshold risk criteria. Specifically, they are set at an excess lifetime cancer risk (ELCR) of 1 in 1 million $(1x10^{-6})$, which represents the lower bound, or point-of-departure, of the USEPA cancer risk range, and a target hazard index (HI) of 0.1, which represents $1/10^{th}$ the maximum acceptable risk level for non-carcinogenic health effects.

Elaine Hammick February 12, 2007 Page 2 of 3

Collectively, the residential soil PRG screening values and site-specific background values are used to select chemicals of potential concern (COPCs). COPCs are the chemicals that could pose more than a negligible risk and are therefore quantitatively evaluated in the risk assessment. According to USEPA Region IV risk assessment guidance, chemicals are selected as COPCs if their maximum detected concentrations are greater than both the USEPA Region IX residential soil PRG screening value and the site-specific background value.

A review of the information presented in Table 3A indicates that seven inorganic analytes were detected at concentrations greater than the residential PRG screening values: aluminum, antimony, arsenic, iron, manganese, thallium, and vanadium. Of these analytes, aluminum, arsenic, and iron were detected at concentrations below the site-specific background values in all of the samples. Based on the soil data collected to date and presented in Table 3A, these three analytes would not be selected as COPCs in a risk assessment. Manganese and thallium were each detected in one sample at a concentration greater than the site-specific background value, and vanadium was detected in two samples at concentrations greater than the site-specific background values. Antimony was not detected in the Site-specific background data set, but the maximum detected concentration in samples collected from the Site is less than the background value for Piedmont soils. These analytes are further discussed in the context screening-level health risks.

Antimony. Antimony was detected at location SS-03-02 at a concentration (5 mg/kg) slightly above the residential soil PRG screening value of 3.1 mg/kg. If it was assumed that children and adults contacted soil at this location almost every day during play and outdoor activities, the HI would be only 0.17, which is well below the USEPA threshold HI of 1. This indicates that antimony at this location does not pose a health risk in excess of USEPA risk limits.

Manganese. Manganese was detected at location SS-02-02 at a concentration (830 mg/kg) above the residential soil PRG screening value of 180 mg/kg. If it was assumed that children and adults contacted soil at this location almost every day during play and outdoor activities, the HI would be only 0.46, which is well below the USEPA threshold HI of 1. This indicates that manganese at this location does not pose a health risk in excess of USEPA risk limits.

Thallium. Thallium was detected at locations SS-07-01-03, SS-08-01-02, and SS-09-01-02 at concentrations ranging from 4.5 mg/kg to 12 mg/kg, which are above the residential soil PRG screening value of 0.52 mg/kg. If it was assumed that children and adults contacted soil at each of these locations almost every day during play and outdoor activities, the HI values would range from 0.86 to 2.3. However, the HI associated with the Site-specific background value of 9.1 mg/kg (a HI of 1.8) is also greater than 1. For all of the soil samples except SS-08-01, the risk associated with exposure to thallium at the background locations is greater than the risk associated with exposure to thallium in samples collected at the Site. For sample SS-08-01, the

Elaine Hammick February 12, 2007 Page 3 of 3

incremental risk, which is the risk that is over and above the risk associated with the natural background conditions, is 0.5, which is below the threshold HI of 1. It is notable also that the maximum concentration of thallium in the Site-specific background soil data set (14 mg/kg) is higher than the maximum concentration detected in soil samples collected at the Site. Collectively, this suggests that risks associated with thallium in soil samples collected at the Site are not distinguishable from risks associated with soil samples collected at background locations.

Vanadium. Vanadium was detected at the majority of locations at concentrations above the residential soil PRG screening value of 7.8 mg/kg, ranging from 8.2 mg/kg to 200 mg/kg. If it was assumed that children and adults contacted soil at these locations almost every day during play and outdoor activities, the HI values for all but five of the locations would be below 1. However, the HI associated with the Site-specific background value of 150 mg/kg (a HI of 1.9) is also greater than 1. For all of the soil samples except SS-02-02 and SS-02-05, the risk associated with exposure to vanadium at the background locations is greater than the risk associated with exposure to vanadium in samples collected at the Site. For samples SS-02-02 and SS-02-05, the incremental risk, which is the risk that is over and above the risk associated with the natural background conditions, are HI values of 0.64 and 0.13, respectively, which are below the threshold HI of 1. It is notable also that the there is only one sample collected at the Site with a concentration greater than the maximum detected vanadium concentration in the Site-specific background soil data set (170 mg/kg). Collectively, this suggests that risks associated with vanadium in soil samples collected at the Site are not distinguishable from risks associated with soil samples collected at background locations.

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Attachments

Table 3A	AOC Soil Analytical Results vs. Human Realth Screening Values	Step 1 RJ Implementation	October 2005
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Heary's Knob Former Mine Site York County, South Carolina

COMMINISTRY	Sample ID	Cyande-Total	Avminum	Antimony	Arsenc	Валит	Beryalum	Cadmum	Calcum	Chromum	Coball	Copper	Iron	Lead	Mannest m	Mannana	H	F	ł	1	1			V.C.	
Column C	SCO1-01X00XX	030	Day.	Day of	шала	mg/kg	тала	mg/kg	mg/kg	фу/бш	morko	morka	moden		-	_		_	_				-	H	2
Color Fig. 1979 Color	SE OF WANDAWA	500	4.500	× 0.29	2.9	71	< 0.23	< 0.12	< 290	1	53	7.6	200	To a division in the same of t	Dage	+	-	0				_		-	Arr.
Colora C	SOUTH PROPERTY OF THE PARTY OF	400	710	< 0.32	4.7	26	× 0.26	c 0 13	c 320		T. Secretary		2000	0	× 290	*		•	SÉ	100	r	ľ	1	ľ	1
Color 1900 Color	SS-01-03X00XX	< 0.52	980	× 0.26	5.4	67	< 0.21	4010	200	1	20100	7	29,000	1.8	< 320	٧			1	178	t	1	+	1	
Color 1,000 Color Colo	SS-01-04X00XX	< 0.62	880	× 0.26	1.0	81	.000		200	000	414	12	27,000	23	< 260	-	-	ľ	T	10	1	1	1		7
COLONIO 11000 COLONIO COLONI	SS-01-05X00XX	c 0 53	1 000	A 0 26			100	0.0	097	10	4.4	9.2	19,000		< 260	-		1	-	1	1	1	-		
Color Colo	SS-01-06X00XX	40 ×	42 000	1000			703	× 0.10	< 260	2.0	414	9.6	15.000	22	C 260			1	-		1				
COUNTY C	SE NO DEVOUE		2007	100	0.0	1305	0.34	< 0.15	. < 370	10	6. 4	25	f	1	04.0	1	+	1		į,				-	
Colorado	SOUND OF THE PARTY	*	2,100	< 0.27	23	70	< 0.22	4 0 11	< 270	5.5	1.	,	٠	1	t	1	1	1		17.7	(3)	-		-	1
Color 1,000 Color Colo	SO-UC-UCAUUAA	< 0.61	41,000	× 0.31	2.8	7	077	< 012	< 310	7		-	2000	1	1	1	*	*	11.1	7	1	H	-	ŀ	
COMES 1,1000 COLUMN CO	25-02-03X00XX	< 0.55	7,100	< 0.28	2.7	39	0.22	110 4	280	30			000'99		-	Y		18.4	-	1	t	t	+	ľ	
COME 17000 COLUMN COLU	SS-02-04X00XP	× 0.64	15,000	< 0.32	3.7	66	0.17	***	1 330		200	62	36,000		< 280		*	~		1	t	1	1	-	CNTS
1,000 1,00	SS-02-04X00XX	× 0.64	17,000	< 0.32	97	61	0.42		200	7	113	8	000'09		< 320		*	-	1	1	+	İ	+	-	
COLONIA 1,000 COLONIA LANCA COLONIA	SS-02-05X00XX	< 0.68	32,000	× 0.34	0.9	81	0.67	200	200	2	91 >	×	46,000		< 320		-		T	1	+	+	+		
Color Colo	\$5-03-01X00XX	< 0.63	15,000	.031		200			240	1	2 81 2	2. Bar	66,000		< 340	İ	-	-	T	1	+	+	1		
Colstant Colstant	SS-03-02X00XX	050 >				2	0.36	< 0.12	< 310	22	1.7	17	000'09	-	< 310	t	ł		T	1	1	1	d	100	
CONTRILLIAND CONT	SS-03-03X00XX	× 0.56	T	1000	9	200	< 0.20	× 0.10	< 250	0.88	c13	7.2	14.000	t	030	-	1	-	4	4	1			-	
Coloniary Colo	SC OF DIVIDING		200	970	-	140	0.30	< 011	< 280	11	415	17	600.00	+	2007	1	*	*		v			-	+	
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Color Colo	55-03-03X00XX	× 0.54	7 440	J< 0.27		W. 120. W	< 0.22	.000	020	100	*	772	8,400			-		*		-	+	Ť	1	1	1
Color Colo	SS-05-04X00XX	< 0.52	7 980	J< 0.26		MELLET AD TO WE	× 0.21	20.00	2000	0.40	*	20	9.800				-	*	-	1	t	Ť	-	1	
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Column C	SS-07-02X00XX	1303	00000	2000		70	< 0.21	4 0 10	< 260	2.0	414	5.6	22.000	t	1	t	t	-	1	1	1	1	-	< 26	
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Color Colo	SC DR.DIVOOVY		1	0.70		- C110	0.25	< 0.10	280	4.5	1.5	15	48 000	+	1		1	1	14					7.55	ĺ
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Control Cont	200000000000000000000000000000000000000	4 0 95	007.9	3< 0.56	3.8 ~	58	0.31	× 0.10	× 260	İ	41.5	38	43 000	+	200		+			27	H	T		< 27	T
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MACTEC, Inc.	
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<u>MEMORANDUM</u>

DATE:	February 12, 2007
FROM:	Jay Peters
SUBJECT:	Human Health Risk Screening - Soil Data - Henry's Knob Former Mine Site
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Elaine Hammick February 12, 2007 Page 2 of 3

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Elaine Hammick February 12, 2007 Page 3 of 3

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Attachments

AOC Soil Analytical Bendiu v. Human Belath Servening Valuer
Step 18 Il Insidementation
October, 2006
Benyi Kash Femer Mine Site
Vord Contry, South Carolina

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0.000000000000000000000000000000000000	Sample 10	Cyanoe-1028	- Contraction	Americany	Arbenig	Banum	Beryllum	Cadmum	Calcum	Chromum	Copar		L	F	Magnesium	Manganese	Mercury	Nimbel	Dodgester of	-	1	1	ł		
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Color Colo	01-02X00XX	× 0.64	710	< 0.32	4.7	56	< 0.26	c 0 13	< 320	t		+	20000		000	1	-	1	280	0.6		< 290	690 0	H	× 7.7
Color Colo	01-03X00XX	< 0.52	880	× 0.26	5.4	67	c 021	× 0 10	C 260	1	1	**	2000	1	350	+	+		320	19 44	0.55	< 320	× 0.64		432
Colorado Colorado	01-04X00XX	< 0.52	880	× 0.26	1.9	83	< 021	× 010	< 260	t	1	700	000'77	1	097	+	1		260	10 1	0.26	< 260	< 0.52	22	4 2 6
Colorado Colorado	01-05X00XX	< 0.53	1,000	× 0.26	1.6	2000	< 0.21	010 >	c 260		1	100	0000	+	007		+	1	260		< 0.26	-	< 0.52		100
Colorary Colorary	01-DEXDOXX	× 0.74	12,000	< 0.37	5.0	1 3 130 Ast	0.34	40.46	041	+		000	+	+	097					-3	< 0.26	-	< 0.53	1	637
Cost Cost	02-01X00XX	× 0.54	2,100	< 0.27	2.3	70	C 0 33		020	t		200	7	2	370					J		-	< 0.74	1	
Colorado 1,1000 Colorado	32-02X00XX	< 0.61	41,000	× 0.31	2.8	77	0.77		0/2 >	00	17	15	19,000	6.	270			-	-	L	< 0.27	H	2000	t	
Color 11000 Color Section Color Co	02-03X00XX	< 0.55	7 100	× 0.28	3.3	00	2000	70.0	× 310	34	28. 5.7	7.9	66,000		680. %			7	099	H	+	1	. 000	17	
Color 17,000 Color Col	02-04X00XP	× 0.64	15,000	× 0.12		200	270	100	< 280		33	2	35,000	33	280			-		t	+	280	1000	8	15
Color 12000 Color Colo	12-04X00XX	× 0 64	17.000	4040		8	200	1013	v 320		<1.7	30	20,000		320		H	2.6		t	0 13	1	t	200	20
COMMINISTRY COMMINISTRY	12-05X00XX	< 0.68	32 000	× 0 %	4.0		045	× 0.13	× 320	1	6.1.6	75	Ц		320	-	-	2.6	1	1	+	130	t	60	7.8
Color Colo	3-01X00XX	5.063	000				190	4014	< 340		6 18 5	83			340	-	-	4.8	-	-	t	1	ľ	011	6.
Colored Colo	3-02X00XX	900	1	100	2 :	2:	0.36	< 0.12	< 310	22	1.7	1	0000'09		310	-	F	t	ľ	ŀ	t		1	100777	
Color Colo	13.03X00xX	2000	7	20.00	97	8	× 0.20	c 0.10	× 250		c 1.3	7.2	14,000		250	+	-	1	1		1	1	< 0.63		19
Color Colo	2000000	000	16,000	< 0.28	5.1	140	030	× 011	< 280		< 15	43	\$8,000		280	-	+	1	1	1	1		< 0.50	20	< 3.1
Color 14600 Local Loca	SOUTH	× 0.54	7 1.400	J< 0.27	2.4	187	< 0.22	< 0.11	< 270	-	614	6.3	L	t	220	t	t	t	1	- 1		1	950	58	14
COST 1440 Left	3-02X00XX	< 061	14,000	J< 0.30	4.9	J 58	0.32	< 0.12	< 300	t	416	11	1	†	200		+	1	1				J< 0.54	9	62
COST 1400 14	- OXDOXED-S	< 0.52	1450	J< 0.26	1.6	T31130	< 0.21	< 0.10	< 260	t	71.0	200		1	1	+	+	1		VOII	< 0.30	0	J< 0.61	110	9.7
COST 1000 14.0 km 2.0 E-Ji 1905 COST	S-USAUGXX	* 0 54		Je 0.27	1.4	. J. 120	< 0.22	c 0 11	c 270		71.0	100		1	+	1	+		260	-			0.52	-	< 28
Color Colo	SOCKOOK	< 0.52		J< 0.26	2.0	6-31 160 St.	< 0.21	< 0.10	< 260	t	214	88		-		1	+	1	270				750%	3.2	× 27
Color Colo	Seasouck	< 0.52	П	J< 0.26	1.4	99 0	< 0.21	× 010 ×	< 260	t	21.4	40	-	+	+	+	1	1	1	Į.			0.52	-	3.0
COLOR 1,0000 COLOR 120	7-01X00XX	< 0.52	J740	J< 0.26	1.9	62	< 0.21	× 010 ×	< 260	t			1	t	1	1	1	1	1	17.			0.52	-	< 26
Colored Colo	7-02X00XX	< 0.53		J< 0.26	3.0	20	0.36	c 0 11	250			000	1	1	1		*	2.1	16	1	× 0.26 ×	280 5	4.5		× 24
COLOR 17,000 COLOR 12,000 COLO	7-03X00XX	< 0.52		× 0.26	1.9	13	0.25	A 0 10	280	10.1	0 4	R	1	98	1			0.4	53	57.4	H	Ť	4711299	313	1 6.6
	8-01X00XX	× 0.54	r	J< 0.27	3.2	32	0.47		500	t			1		1	1	-	2.4	17		× 0.26 ×	-	48		426
COSM 170000 Land	8-02X00XX	< 0.53	1	34 0 26	3.8	58	031	0000	200	†	-	- 12	-	1	1			3.6		H	< 0.27	< 270	288.	t	
CORRELISTATION 1.500 00	9-01X00XX	× 0.56	013,000	730	139	76	010	1	1000	t			1	1	1	1	-	2.5			< 0.26	*.	12 6	36	× 2 K
VEX.NO.CO.3 VEX.NO.CO.3 1.15 co.0 1.2 co.0 1.15 co.0	9-02X00XD	> 066	-	J< 0.33	4.0	33	990	5011	100	+	0 .	25	-	1	460	-	1				< 0.28 ·	H	1.6.45 CM	3.6	1,160
WEAL HOLDS N.D. 41,000 8.D. 6.D. 1.32	- XXDQXZZO-S	990 ×	15.000	10.44	3.5	25	0.52	× 013	011	+	1	33	1		Z 600 - 2		-	9 9			< C33 <	330 5.7	2.0.2	1	114
NO 47,510 NO 47,510 NO 53 59 59 59 NO 430	mum Detected Value (AOCs)	QN	41,000	8.0	6.0	1 160	0.77	9	-830 e.h	t	1	+	1	ł	1	1	1	6			< 0.33		3	99	187
Rical Hould: 1 ND 47,610 ND 8.3 69 0.9 ND 430° 54 69 80 73,981 17 599 348 ND 95 1,000 GSH Hould: 1,200 1,500 4.7 1,600 4.4 1,600 4.0 1,000 800 1,000 800 1,000 800 1,000 <td>Times Anthreetic Mean</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td>4.00</td> <td></td> <td>1</td> <td>2</td> <td>4</td> <td>7</td> <td>4.4</td> <td>15</td> <td>570</td> <td>L</td> <td>0.55</td> <td>NO PR</td> <td></td> <td></td> <td>18081</td>	Times Anthreetic Mean									1	4.00		1	2	4	7	4.4	15	570	L	0.55	NO PR			18081
Risarthorn 1 220	(punout)	9	47,610	Q	6.0	68	8	5		;				-			7 2000					Γ	1	t	
1,000 10,000 41 1,000 150	in IX Residential PRGs HQ=0 1	120	7.600	- 67	0 39c	2	94	2:	3	X S	n .		1.961	-	299	348		9.6	1,083	3.8	1.60	CN	0.0	5	
Approind Value ND 17 150 10 ND 430 120 14 160 20 20 730 2.500 ND 11 1,000 11 1,000 10 10 10 10 10 10 10 10 10 10 10 10	on IX Industrial PRGs HO=0.1	1,200	10,000	41	160	6 700	190	44	TOURS OF THE PERSON	2100	140rc	+	2300	1	Intrent	180	10		utnent	39	39	nutrient	0.52	3 4	2300
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224 5 16 12412 1512 2529 288 0.23° 104 2843	novi Background	7.	30 808	78			,					ŀ	ŀ	-	ł	-	+	t	8	5.1	130	9	14	170	33
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MACTEC, Inc.	
MACTEC Engineering and Consulting	
MACTEC Development	

MEMORANDUM

DATE:	February 12, 2007
FROM:	Jay Peters
SUBJECT:	Human Health Risk Screening - Soil Data - Henry's Knob Former Mine Site
TO:	Elaine Hammick
COPY TO:	File

The soil data collected in support of the Remedial Investigation (RI) for the Henry's Knob Former Mine Site (Site) were compared to various screening values in the Step 1 RI Report (MACTEC, 2006) to help place perspective on the significance of the detected concentrations and to help guide future site investigation activities. This memorandum provides additional discussion concerning potential risks to human health.

Table 3A of the Step 1 RI Report presented a comparison of analytical results for soil samples collected throughout the Site to USEPA Region IX Preliminary Remediation Goals (PRGs) for residential use soil, USEPA Region IX PRGs for industrial use soil, Piedmont background soil concentrations, and site-specific background soil concentrations. Table 3A is attached to this memorandum for reference.

The USEPA Region IX PRG values are risk-based soil concentrations that are protective for exposures to analytes in soil at specified target risk levels. The residential soil PRGs are protective for young children and adults who are assumed to ingest and contact soil, and inhale soil-derived dust, during activities such as gardening and playing on the ground, 350 days per year over a 30-year period. The industrial soil PRGs are protective for adults who are assumed to ingest and contact soil, and inhale soil-derived dust, during work-day activities, 250 days per year over a 25-year period. The PRG values used for soil data comparisons in Table 3A are considered to be PRG screening values because they are based on target risks below the EPA threshold risk criteria. Specifically, they are set at an excess lifetime cancer risk (ELCR) of 1 in 1 million (1x10-6), which represents the lower bound, or point-of-departure, of the USEPA cancer risk range, and a target hazard index (HI) of 0.1, which represents 1/10th the maximum acceptable risk level for non-carcinogenic health effects.

Elaine Hammick February 12, 2007 Page 2 of 3

Collectively, the residential soil PRG screening values and site-specific background values are used to select chemicals of potential concern (COPCs). COPCs are the chemicals that could pose more than a negligible risk and are therefore quantitatively evaluated in the risk assessment. According to USEPA Region IV risk assessment guidance, chemicals are selected as COPCs if their maximum detected concentrations are greater than both the USEPA Region IX residential soil PRG screening value and the site-specific background value.

A review of the information presented in Table 3A indicates that seven inorganic analytes were detected at concentrations greater than the residential PRG screening values: aluminum, antimony, arsenic, iron, manganese, thallium, and vanadium. Of these analytes, aluminum, arsenic, and iron were detected at concentrations below the site-specific background values in all of the samples. Based on the soil data collected to date and presented in Table 3A, these three analytes would not be selected as COPCs in a risk assessment. Manganese and thallium were each detected in one sample at a concentration greater than the site-specific background value, and vanadium was detected in two samples at concentrations greater than the site-specific background values. Antimony was not detected in the Site-specific background data set, but the maximum detected concentration in samples collected from the Site is less than the background value for Piedmont soils. These analytes are further discussed in the context screening-level health risks.

Antimony. Antimony was detected at location SS-03-02 at a concentration (5 mg/kg) slightly above the residential soil PRG screening value of 3.1 mg/kg. If it was assumed that children and adults contacted soil at this location almost every day during play and outdoor activities, the HI would be only 0.17, which is well below the USEPA threshold HI of 1. This indicates that antimony at this location does not pose a health risk in excess of USEPA risk limits.

Manganese. Manganese was detected at location SS-02-02 at a concentration (830 mg/kg) above the residential soil PRG screening value of 180 mg/kg. If it was assumed that children and adults contacted soil at this location almost every day during play and outdoor activities, the HI would be only 0.46, which is well below the USEPA threshold HI of 1. This indicates that manganese at this location does not pose a health risk in excess of USEPA risk limits.

Thallium. Thallium was detected at locations SS-07-01-03, SS-08-01-02, and SS-09-01-02 at concentrations ranging from 4.5 mg/kg to 12 mg/kg, which are above the residential soil PRG screening value of 0.52 mg/kg. If it was assumed that children and adults contacted soil at each of these locations almost every day during play and outdoor activities, the HI values would range from 0.86 to 2.3. However, the HI associated with the Site-specific background value of 9.1 mg/kg (a HI of 1.8) is also greater than 1. For all of the soil samples except SS-08-01, the risk associated with exposure to thallium at the background locations is greater than the risk associated with exposure to thallium in samples collected at the Site. For sample SS-08-01, the

Elaine Hammick February 12, 2007 Page 3 of 3

incremental risk, which is the risk that is over and above the risk associated with the natural background conditions, is 0.5, which is below the threshold HI of 1. It is notable also that the maximum concentration of thallium in the Site-specific background soil data set (14 mg/kg) is higher than the maximum concentration detected in soil samples collected at the Site. Collectively, this suggests that risks associated with thallium in soil samples collected at the Site are not distinguishable from risks associated with soil samples collected at background locations.

Vanadium. Vanadium was detected at the majority of locations at concentrations above the residential soil PRG screening value of 7.8 mg/kg, ranging from 8.2 mg/kg to 200 mg/kg. If it was assumed that children and adults contacted soil at these locations almost every day during play and outdoor activities, the HI values for all but five of the locations would be below 1. However, the HI associated with the Site-specific background value of 150 mg/kg (a HI of 1.9) is also greater than 1. For all of the soil samples except SS-02-02 and SS-02-05, the risk associated with exposure to vanadium at the background locations is greater than the risk associated with exposure to vanadium in samples collected at the Site. For samples SS-02-02 and SS-02-05, the incremental risk, which is the risk that is over and above the risk associated with the natural background conditions, are HI values of 0.64 and 0.13, respectively, which are below the threshold HI of 1. It is notable also that the there is only one sample collected at the Site with a concentration greater than the maximum detected vanadium concentration in the Site-specific background soil data set (170 mg/kg). Collectively, this suggests that risks associated with vanadium in soil samples collected at the Site are not distinguishable from risks associated with soil samples collected at background locations.

JP

Attachments

Table JA
AOC Seil Analytical Results. Human Beath Screening Vision
Step 1 RI Implementation
October 2008
Henry Acad Former Mine Site
York County, Soath Carolina

6	Cyanide-Total	Aluminum	Antimony	Arserac	Banum	Berysum	Сафтит	Calcum	Chiomain	Cohee	1	1	f	- 1	-			200						
Sample ID	mg/kg	mg/kg	mg/kg	moka	marka	mo/kn	marken	- Parke		-	editor	HO!	Lead N	Magnesium Mar	Manganese	Mercury	Nickel Pe	S mussing	Selenium	Salver	Soderies To	1	1	
SS-01-01X00XX	× 0.59	4.500	< 0.29	20	7.	2000		DW. CHILL	9	pa/em	DI ONO	moka	mo/kg	mg/kg r		mg/kg	ma/ka		-			_	E	
SS-01-02X00XX	× 0.64	710	< 0.10 >	1.7		200	70.17	200		53	76	48,000		-	-	ľ	ľ	100	1	+			талка талка	CO.
SS-01-03X00XX	< 0.52	RRO	900 >		8 8	200	< 0.13	× 320		. 2017	12	29,000		-	11	+	1	7	٧	1	× 280	+		35
SS-01-04X00XX	< 0.52	880	9000		/0	170 >	< 0.10	< 260	36	414	7.2	27,000				< 0.086 ×	1	T	-	1	1	-		
SS-01-05X00XX	< 0.53	1000	0.00		200		< 0.10	< 260	89.	¢14	9.2	19,000	26	-	47	1	1	200	1000	1	1	1		
SS-01-06X00XX	× 0.74	12 000	2000		3	*	< 0.10	< 260	20	*14	5.6	15.000		-	-	t	1	200	1	1	*		430	
SS-02-01×00××	1			0.0	302	2034	< 0.15	< 370	10	613	38	H	2::	< 370	2 07	t	1	200	T 1000	1	< 260 < 0	0.53 10	-	
SS-02-02X00XX	100	200	17.0 >	77	70	< 0.22	× 0.11	< 270	5.5	17	15	H	ŀ	ŀ	t	t	1	1			~		c 11	
SCOOL OLIVORY	1000	000'14	< 0.31	2.8	4	0.77	< 0.12	< 310	İ		79	98 000	T	1	1	1	277	7	時に		< 270 < C	< 0.54 27	T	
SE OF OAKBOKE	CO 00	7,100	× 0.28	2.7	39	0 22	< 0.11	< 280	9.6	1.3	21	25,000	T		13-0	1	9.5-1	260	3.6	< 0.31 <	< 310 < 0	d	D. P. P. Cudent	3
SC OO DAKOOKA	*0.0×	15,000	< 0.32	3.7	99	0.37	< 0.13	× 320	12	417	25	20000	7 4	200	2:	-	< 22 <	20.			< 280 < 0	< 0.55 59		
CC 03 06 00 00 00 00	× 0.04	17,000	< 0.32	4.0	61	0.42	< 0.13	< 320	11	416	2	2000	T	+	1	× 0110×	2.6			< 0.32 <	< 320 < 0	-	-	1
33-05-03Y00XX	< 0.68	32,000	× 0.34	6.0	1.8	0.67	× 0.14	× 340	31			90000	20 .	+	49	< 0.10	2.6	410		-	-	+	1	İ
SS-03-01 X00XX	< 0.63	15,000	< 0.31	4.5	23	0.36	< 0.12	010	-		2	000.00	1	-	1	0.11	4.8	1	. 72 . c			1	200	
SS-03-02X00XX	< 0.50		- 2.0 C	1.5	09	< 0.20	× 010	500 ×	77		1	000009	6.1	< 310	2	Н		2	> 64:189	< 031 <	t	1	1	I
SS-03-03X00XX	< 0.56	16,000	× 0.28	6.1	A. 140 F	0.10		2 200	98.0		1.2	14,000	1			< 0.084 ×	*		14	1	-	+	1	
SS-05-01X00XX	× 0.54	7 1.400	Je 0.27	3.5	187					615	4	28.000	1		33 <		2.6	1	H Sa	+	000 000 000 000 0	200	*	1
SS-05-02X00XX	< 0.61	7 14,000	Je 0.30	40	1 68	200		0/7	66.0	× 14	6.3	21,000	8.0	-	-	> 0600 >	< 22 -	1	L	t	t	+	+	1
SS-05-03X00XD	< 0.52	†	Je 0.26	10	- 400	,000	20.0	2000	14	4 16	37	53,000			-	< 0.10		100	1	1	1	10	+	
SS-05-03X00XX	× 0.54	7 440	Je 0.27		L'ALTON A	, 000	200	007	0.51	* . *	22	8,400		*	o 79 ×	× 0.087 ×	· ·	260	+	Ť	Ť	+	1	1
SS-05-04X00XX	< 0.52	1 980	Je 0.26		4.60		1000	0/7	0.48	× 1.4	2.0	9,800	1.2		× 081 ×	× 0.090 ×	-	1	200	0.00	1	1		
SS-05-05X00XX	< 0.52	011000	J< 0.26	17.	1 66	.00	0.00	× 260	0.84	* 1 *	6.5	22,000	2.5	< 260 . < (1	-	1	+		× 270 J× 0.54	32	*	
SS-07-01X00XX	< 0.62	1.740	20.00	1			200	× 780	-	414	40	9,800	1.8	-	24	-	× 21 ×	, OBC >	1 17.000	-	1			
\$\$-07-02X00XX	< 0.53	1 10 000	14 0 36		70	< 0.21	< 0.10	< 260	2.0	*1.	5.6	22,000	23	1	126	ł	t	1	+	+	1	-	< 2.6	
SS-07-03X00XX	< 0.52	2700	0000		200	800	v 0.11	× 260	6.1	0.7	30	31,000	36	7 660	-	< 0.0RB	1	1	114041	٧ <u> </u>	Ī		< 26	
\$\$-08-01X00XX	200	t	2000	T	36-110-20	670	< 0.10	280	4.5	1.5	15	48 000	8.6	H	t	L	t	A 260		970	< 250 GR #7	2 2 2	155	
SS-08-02X00XX	< 0.53	T	1× 0 26	7	200	0.47	110 >	280	4 8	*1.4	22	35,000	t	× 270 J.8	t	ŀ	1	1	1	+	1	1	< 26	
55-09-01X00XX	500	t.			2	150	010	× 260	3.9	+14	28	52,000	27 4	260 38	-		1	2 260 evin	O S SERVICE COM	170 3	270 072	14	<27	
\$\$-09-02X00XD	× 0.66	+	14 0 31	100	0/0	0.00	× 0.11	820	16		7.3	35,000	120	7 460		-	1	I	1	1		3	< 2.6	1
\$5-09-02X00XX	× 0.66	t	1044	3.6	36	900	c 0.13	< 330	12	Ī	3.5	48,000	Ì	4 10	*	-	1	1	1	97.0 3	1	i		14.
Maximum Detected Value (AOCs)	92	41 000			1	1	210	000		1	32	59,000		J 460 J 3	35 <	< 0.11		420	1	1	7			
wo Times Anthmetic Mean					100	110	9	# 820 S	7	10,328	1-(83	000'99	120 .7. 6	2,500 3 8 45 830	3	0.46	3. K	P		1	330	99	1	1
(Background)	9	47.610	Š	10	0	0	1	-										1	+		1	2120.0.11. 200	160	9
Region IX Residential PRGs HQ=0 1	120	7,500	3.1	0.39-	3	ħ .	2:	430	z	6.9	8	73,981			148	7/6		1 083	_		_	10 200		
Region IX Industrial PRGs HQ+0 1	1,200	10.000	41	1.6c	6 700	100	77	numera	2100	140nc*	310	2,300	907		180	2.3	160	200	9 0		_			
Maximum Detected Background Value								nonen	4300	1300nc	4,100	10 000	900	1 1	006			nutnent	-	510	outstand of	20.0	2,300	
	9	48.000	9	17	150	10	9	430		;	-			-	-				ŀ	t	+	-	-	J
Predmont Background	7								2		091	78 000	8	730	2 500	9	-	100	5.1	30	- QV	170	8	
SON COCONTINUES	-	32.695	*9	18	68	0.62	+3	928	38		91	32.412	-15 13	2.529	288	100				-		-	-	T
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MACTEC, Inc.	
MACTEC Engineering and Consulting	
MACTEC Development	

<u>MEMORANDUM</u>

DATE:	February 12, 2007
FROM:	Jay Peters
SUBJECT:	Human Health Risk Screening - Soil Data - Henry's Knob Former Mine Site
TO:	Elaine Hammick
COPY TO:	File

The soil data collected in support of the Remedial Investigation (RI) for the Henry's Knob Former Mine Site (Site) were compared to various screening values in the Step 1 RI Report (MACTEC, 2006) to help place perspective on the significance of the detected concentrations and to help guide future site investigation activities. This memorandum provides additional discussion concerning potential risks to human health.

Table 3A of the Step 1 RI Report presented a comparison of analytical results for soil samples collected throughout the Site to USEPA Region IX Preliminary Remediation Goals (PRGs) for residential use soil. USEPA Region IX PRGs for industrial use soil, Piedmont background soil concentrations, and site-specific background soil concentrations. Table 3A is attached to this memorandum for reference.

The USEPA Region IX PRG values are risk-based soil concentrations that are protective for exposures to analytes in soil at specified target risk levels. The residential soil PRGs are protective for young children and adults who are assumed to ingest and contact soil, and inhale soil-derived dust, during activities such as gardening and playing on the ground, 350 days per year over a 30-year period. The industrial soil PRGs are protective for adults who are assumed to ingest and contact soil, and inhale soil-derived dust, during work-day activities, 250 days per year over a 25-year period. The PRG values used for soil data comparisons in Table 3A are considered to be PRG screening values because they are based on target risks below the EPA threshold risk criteria. Specifically, they are set at an excess lifetime cancer risk (ELCR) of 1 in 1 million $(1x10^{-6})$, which represents the lower bound, or point-of-departure, of the USEPA cancer risk range, and a target hazard index (HI) of 0.1, which represents $1/10^{th}$ the maximum acceptable risk level for non-carcinogenic health effects.

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Collectively, the residential soil PRG screening values and site-specific background values are used to select chemicals of potential concern (COPCs). COPCs are the chemicals that could pose more than a negligible risk and are therefore quantitatively evaluated in the risk assessment. According to USEPA Region IV risk assessment guidance, chemicals are selected as COPCs if their maximum detected concentrations are greater than both the USEPA Region IX residential soil PRG screening value and the site-specific background value.

A review of the information presented in Table 3A indicates that seven inorganic analytes were detected at concentrations greater than the residential PRG screening values: aluminum, antimony, arsenic, iron, manganese, thallium, and vanadium. Of these analytes, aluminum, arsenic, and iron were detected at concentrations below the site-specific background values in all of the samples. Based on the soil data collected to date and presented in Table 3A, these three analytes would not be selected as COPCs in a risk assessment. Manganese and thallium were each detected in one sample at a concentration greater than the site-specific background value, and vanadium was detected in two samples at concentrations greater than the site-specific background values. Antimony was not detected in the Site-specific background data set, but the maximum detected concentration in samples collected from the Site is less than the background value for Piedmont soils. These analytes are further discussed in the context screening-level health risks.

Antimony. Antimony was detected at location SS-03-02 at a concentration (5 mg/kg) slightly above the residential soil PRG screening value of 3.1 mg/kg. If it was assumed that children and adults contacted soil at this location almost every day during play and outdoor activities, the HI would be only 0.17, which is well below the USEPA threshold HI of 1. This indicates that antimony at this location does not pose a health risk in excess of USEPA risk limits.

Manganese. Manganese was detected at location SS-02-02 at a concentration (830 mg/kg) above the residential soil PRG screening value of 180 mg/kg. If it was assumed that children and adults contacted soil at this location almost every day during play and outdoor activities, the HI would be only 0.46, which is well below the USEPA threshold HI of 1. This indicates that manganese at this location does not pose a health risk in excess of USEPA risk limits.

Thallium. Thallium was detected at locations SS-07-01-03, SS-08-01-02, and SS-09-01-02 at concentrations ranging from 4.5 mg/kg to 12 mg/kg, which are above the residential soil PRG screening value of 0.52 mg/kg. If it was assumed that children and adults contacted soil at each of these locations almost every day during play and outdoor activities, the HI values would range from 0.86 to 2.3. However, the HI associated with the Site-specific background value of 9.1 mg/kg (a HI of 1.8) is also greater than 1. For all of the soil samples except SS-08-01, the risk associated with exposure to thallium at the background locations is greater than the risk associated with exposure to thallium in samples collected at the Site. For sample SS-08-01, the

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incremental risk, which is the risk that is over and above the risk associated with the natural background conditions, is 0.5, which is below the threshold HI of 1. It is notable also that the maximum concentration of thallium in the Site-specific background soil data set (14 mg/kg) is higher than the maximum concentration detected in soil samples collected at the Site. Collectively, this suggests that risks associated with thallium in soil samples collected at the Site are not distinguishable from risks associated with soil samples collected at background locations.

Vanadium. Vanadium was detected at the majority of locations at concentrations above the residential soil PRG screening value of 7.8 mg/kg, ranging from 8.2 mg/kg to 200 mg/kg. If it was assumed that children and adults contacted soil at these locations almost every day during play and outdoor activities, the HI values for all but five of the locations would be below 1. However, the HI associated with the Site-specific background value of 150 mg/kg (a HI of 1.9) is also greater than 1. For all of the soil samples except SS-02-02 and SS-02-05, the risk associated with exposure to vanadium at the background locations is greater than the risk associated with exposure to vanadium in samples collected at the Site. For samples SS-02-02 and SS-02-05, the incremental risk, which is the risk that is over and above the risk associated with the natural background conditions, are HI values of 0.64 and 0.13, respectively, which are below the threshold HI of 1. It is notable also that the there is only one sample collected at the Site with a concentration greater than the maximum detected vanadium concentration in the Site-specific background soil data set (170 mg/kg). Collectively, this suggests that risks associated with vanadium in soil samples collected at the Site are not distinguishable from risks associated with soil samples collected at background locations.

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Attachments

Ci ci ci ci ci ci ci ci ci ci ci ci ci ci	Cyanide-Total	Aluminum	Antimony	Arsenic	Barrum	Bendlum	Cadmum	Calcula	ŀ	ŀ		ł		WORLD STREET									
Ol and Library	mg/kg	mg/kg	mg/kg	mo/kg	ma/ka		marke			Copp Copp		-	Magnesium	Manganese	Mercury	Nickel	Protangarion	Colonian	t		ŀ	1	1
SS-01-01X00XX	< 0.59	4.500	< 0.29	2.0		I		+	1	-	100	-	maka	mo/ka		morken		Company of the Compan	7	Manage		E	ā
SS-01-02X00XX	< 064	710	< 0.12	1	-	1	< 0.12	+			-		c 260	22	Т	The state of the s	I	рж/бш		mg/kg	mg/kg	ша/и	P
5S-01-03X00XX	< 0.52	RRO	2000		8 5		v 0.13			1	-	+	V 130	1	1000	27.	7	061		< 290	< 0.59		17.7
SS-01-04X00XX	< 0.52	RRO	200	**	10	1	c 0.10	-	36 414	H	-	+	2000	0.00	Т	**	T	6.07		< 320	< 0.64	Г	3.2
SS-01-05X00XX	< 0 \$3	1,000	9000		200		v 0.10	-		-	-	+	0 360	1	T	177	7	2010	1	-	< 0.52	T	2.6
SS-01-06XD0XX	× 074	12,000	× 0 33	0.0	N		× 0 10	-		-	-	+	2000	-	Т	177		2.24			< 0.52	1	3.0
SS-02-01X00XX	2300	50.0	100	200	130.35		< 0.15	-	10 < 19		\$2,000	ŀ	4 170		1000	173	× 260	4.04	× 0.26	× 260	< 0.53	T	27
SS-02-02X00XX	. 061	2000	170	3	70		< 0.11	H	H	1	-	₽	1		,	1	7	4 226	-	-	× 0.74	T	:
SS-02-03X00XX	× 0.86	200.1	1000	87	7		< 0.12	-	-		+	H	0.00	0.0	80.0 v	1	- 1	5.4		H	c 0.54	t	9
SS-02-04X00XP	200	2000	× 0.28	27	39		< 0.11	H	9.5			2 9	2000	8	v 0.10	19.5		3.6		r	< 0.61 A		1
SS-02-04XD0XX	2000	2000	2002	3.7	99		< 0.13	-	H	-	50,000	+	087	2	< 0.092			A 109 F	< 0.28	-	< 0.55	t	1
\$\$-02-05X00XX	1000	0000	< 0.32	97	61	0.42	< 0.13	-	t	t	+	+	4 320	17	× 0 11			# 5.0F	T	+	< 0.64	t	1
SCOLOTYCOXY	0000	25.000	× 0.34	0.9	91	0.67	× 0.14	H	-	177	1	+	0.75	69	c 0.10			PES 530	< 0.32	-	× 0.64	t	0
CC-01-03V00VV	4 0.63	18,000	< 0.31	4.5	23	0.36	< 0.12	ŀ	t	1	-	+	< 340	89	< 0.11			. W. 2		t	< 0.68	5	
SS-03-03×00××	000 0	900	. 029	1.5			× 0.10	-	1	1:	000'09	6.1	< 310	98	< 0.10	2.5	550 . (3	L	r	r	0.63	+	1
VACCOURT OF THE	0.036	16.000	< 0.28	6.1	3140 S	030	× 011	H	+	1	-	-	< 250	8.2	× 0.084		П	-	T	Ť	200	1	2
25-05-01X00XX	*0°	7 1,400	J< 0.27	77	187	Ī	1	1	t	1	-	-	< 280	33	< 0.093	T		W. A.S. S.	× 0.28	1	000	1	2
25-05-02X00XX	< 0.61	7 14,000	J< 0.30	67	1 58	T		+	+	+	-		< 270	1.5	0600 >	İ	т	t	Ì	1	000	1	2
SS-05-03X00XD	< 0.52	7 450	J< 0.28		1130 at	T	70.0	+	1	-	-		< 300	75	o 10 ×	T		0.00	T	1	0.54	1	6.2
SS-05-03X00XX	4 0 54	7 440	J< 0.27	Γ	1 120 187	1	0.00	-	+	-			< 260	< 0.79	< 0.087	İ		-	1	T	190		9.7
SS-05-04X00XX	< 0.52	7 980	J< 0.26	Ī	1 - 1 - 4 an - 2 - 4	İ	100	4	+		-		< 270	× 0.81	c 0 090	t	V440	1	Ť	T	0.52	-	2.6
\$5-05-05X00XX	< 0.52	0	Je 0.26	T	2000	Ī	010	1					< 260	× 0.79	× 0.087		-	-	1		150		2.7
SS-07-01X00XX	< 0.52	t	200			1	010	-	13 414			L	< 280	3.4	- 0.0ec	İ	4	100	< 0.26		0.52	H	3.0
SS-07-02X00XX	c 0 63	5	0.00		29		o 10	H	H	H	22 000	ļ.	000		0000	1	-				0.52	H	2.6
SS-07-03X00XX	c 0 62	+	070	7	R		< 0.11	L	-	-	-	1	200	070	9900	1	\neg	2 4.6	< 0.26	-	4.5 .1.	H	26
SS-08-01X00XX	1	t	200		C 1110 C	0.25	< 0.10	-	45 15	H		1	2000	200	8900 >	1	_	1		1	677.70	33	8
55-08-02X00XX	190	000.	34 02/	12	38	8	< 0.11	L	H	-	ŀ	1		,	0000	1	F			2	254.8Eb 2	Ī	26
SS-09-01X00XX	200	t	20.00	3.8	28		< 0.10 >	-	+		63 000	1	0/7 5	22	690 0 ×	36	-3		H	1	48.8Ch.70	Ī	12
\$\$-09-02X00XD	9000	00000	000	5.7	76		c 011	_	1	H	18,000	1	1	97.0	e 0.08e	1	ч	•	< 0.26	1	*12X	36	2.6
\$\$-09-02X00XX	× 0.66	+	20.03	4.0	33	990	< 0.13	< 330	12 4.17	7	48 000		- 17	000	0.46	1.15	J 480	4.7	< 0.28	H	. C. 8.9.	Γ	OB5 145
Maximum Detected Value (AOCs)	5	2000			52	0.52	c 0 13		-	-	200 65	1	CB00	200	11.0	2.6	J 510	. 5.0 %	< 0.33 ·	-	. 8.0	1.1	9
Wo Times Anthrests Mean		200		6.0	160	0.77		820 + 4	N 9 . 28	-	66,000	ľ	т.		10.0	4.8	1			-	10.10		167
Background)	9	47.610	9				-		H	H		+		0 100	040	× 61%	Ť	3350	H	Q	. 121	200	180
Region IX Residential PRGs HQ=0.1	120	7,600	1	0 390	5 5	50	9	130	3			11	599	348	C	-							
Region IX Industrial PRGs HQ=0.1	1,200	10,000	.7	200	6 700	61	37	nutrient		310	2,300	400	rutherd	180	2.0		1.063	90		9	9.1	_	5
Maximum Detected Background Value					3	26	45	huthent	450c 1300nc			800	nuthers	1 900	31	2000	nomen	80	38	nutrient	0 52	7.8	2,300
	Q	48.000	9	11	Ş				L	L						+	numerik	210	+	nutrient	6.7	-	0.000
Predmont Background				1	2		ON.	430	120 14	160	78 000	20	730	2 500	9	:	1100			-	-		
Soil Concentrations 1	1.5	32.695	6.7	18	69	0.62		928	. m	:									8	2	,	170	2
No.								1	1		318.30	1	2.529	288	0.23	104	2.643	1,1	25	2562	98	a.v.	9
																							1

AOCs Area 7822 Valve 1017 Valve 1

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MACTEC, Inc.	
MACTEC Engineering and Consulting	
MACTEC Development	

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Attachments

Table	AUX. Soil Annytical Results vs. Human Health Screening Values Step RI Implementation	October 2005	Heary's Knob Former Mine Site York County, South Carolina	
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1,000, 1	Sample ID	Cyande I ctal	Auminum	Antimony	Arsenic	Barium	Вегупит	Cadmum	Calcum	Chromum	Cobat	Copper	licon	F	Magnessum M	Mannanese	Marriage	1					100		
Colorado Colorado	S-01-01X00XX	0000	-	1	moved	Dav6m	mg/kg	mg/kg	mg/kg	mg/kg	mo/m	makea	moken	0	-	_	-		Classium	Selenum	Silver		hallum Va	nadum	Time.
Colorado Colorado	COLOSKOVX	6000	4 300	× 0.29	2.9	11	< 0.23	< 0.12	< 290	7.8	6.1	7.8	48 000		Билош	+	mg/kg	mg/kg	толе	толь	mg/kg			- Long	2
Colora C	0.0000000000000000000000000000000000000	× 0.0%	210	< 0.32	4.7	28	< 0.26	4011	4 130		200000		2000	1	082 >		× 0.097	< 2.3		. 06	-	ŀ	1	t	
10 10 10 10 10 10 10 10	S-U1-U3XUUXX	· < 0.52	880	× 0.26	75	67	.031	4.0	-	-	100000	71	29,000		< 320		110 >	4.4	1	10 01	+	-	6.00		1.7
Colorado Colorado	S-01-04X00XX	× 0.52	880	× 0.26		8.1	1000	2	097	3.6	*. *	7.2	27,000		< 260	H	H		1	4 40	1	*			3.2
Color Time Color	S-01-05X00XX	c 0 53	1 000	× 0.36	T	10 1. Det Co. o.	170	010	× 260	8	71.7	9.2	19,000		< 260	-			1	-1	1	v			2.6
Colorado Colorado	SS-01-06X00XX	× 074	42,000	2000	1	1000	120 >	× 010	× 260	2.0	414	5.6	15.000		< 260		+	17	1	- 1	1			-	30
Colorado Colorado	S. O.S. O. I. KOON Y.			150	2	130	0.34	< 0.15	< 370	10	61.9	38	52 000 3	1	4 120	1	+	17.	1					ŀ	2.5
Colorado Colorado	200000000000000000000000000000000000000	* 0.34	2 100	× 0.27	2	70	< 0.22	< 0.11	< 270	**				1		1	1	30	1			-	-	t	
Colorado Colorado	S-UZ-UZADUXA	< 0.61	41,000	< 0.31	2.8	17	077	c 0 13	200	1			19,000		< 270	8		¢ 22			ł	f	ł	1	-
Colorada 15000 Colorada C	S-02-03X00XX	< 0.55	7.100	× 0.28	2.2	30	00.00	31.0	2000	3		6/	66,000			830	ľ	# Q 47.27.2	600	1	1	+	1		4.0
Colora 17000 Colora Co	S-02-04X00XP	× 0.64	16.000	. 0 33			7770	11.0 >	< 280	9.5	33	23	38,000	Г	< 280	1		2	T	1			2	-	31.55
1,000 1,00	S-02-04X00XX	× 0.64	47.000	1000	7.0	8	0.37	< 0.13	× 320	12	c 1.7	30	80,000	t	120	1	1	77	1	00				-	57
1,000 1,00	S-02-05X00XX	× 0.68	20000	7000	0.4		0.42	< 0.13	< 320	13	4.16	34	46,000	-	4 320	1	+		1	74				68	7.8
	A 21 A 1 A 2 A 2 A 2 A 2 A 2 A 2 A 2 A 2		27.000	20.0	0.0		0.67	× 0.14	× 340	21	4 18 4	V. 24.8.V	66.000	1	000		0.0	5.5	410				-		
	Secset About	< 0.63	15,000	< 0.31	4.5	23	0.36	6.017	2000	1	1		00000	ı	340	1	0.11	4.8	570 57	3	-				2 .
Colin Coli	3-03-02X00XX	× 0.50	1,600	. 4 5.02 A	1.5	9	× 0.20	0.00	000	1	1.1	3	000'09		< 310		0.10		ľ		t	t	1		
COST COST	S-03-03X00XX	× 0.56	16,000	< 0.28	6.1	140.4	000	200	200	-	413	7.2	14,000		< 250			t	y i.		1	1	-	30	10
Colin Coli	S-05-01X00XX	700	1 1 100	1000			0.30	1100	× 280	1	415	43	\$8,000	-	< 280	+	+	İ	1		-				3.1
Color Colo	S-05-02X00XX		2000	170 0	*	787	< 0.22	× 0.11	< 270	66.0	414	63	21 000	t	020	t	t	t	1		-	-			14
Colora Laboration Colora Laboration Colora Co	CALDINOVAD	100	200	25 0 30		2.58	0.32	< 0 12	< 300	71	416	37	21,000	İ	017	t	+		1		-	-	-	0	1
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Colorado Colorado	P-U2-U3/UUXX	× 0.54	7 440	J< 0.27		*J. 120 7 60	c 0 22	* 011	2770	+		77	8,400	1	< 260				-	28	t	T	1	+	
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United States Environmental Protection Agency

Henry's Knob Former Mining Site Community Information Update

Clover, York County, South Carolina

March 2008



Tailings-Henry's Knob Former Mining Site, Clover Township, South Carolina

US Environmental Protection Agency Region 4 (EPA) representatives will be interviewing local residents in conjunction with the environmental investigation of the Henry's Knob Former Mining Site in Clover Township, South Carolina. These informal interviews, which are part of EPA's community involvement activities, are designed to help community members and the EPA work together to address environmental concerns. For more information, contact EPA community involvement coordinator Linda Starks at 1-800-435-9233.

Opportunities for Community Involvement

Community Interviews
March 5, 6, and 7, 2008

Save the date!
Community Meeting
April 17, 2008

The EPA is also planning a community meeting in the Clover area for April 17, 2008, to present sampling results and talk about next steps in the cleanup process at the Henry's Knob site. Save the date and watch for details about the April 17 meeting in your local newspaper or receive more information by calling EPA community involvement coordinator Linda Starks at 1-800-435-9233.



Site Background

The Henry's Knob Site is located at the corner of Henry's Knob Road and State Highway 55 in the township of Clover, which is adjacent to the city of York, South Carolina. The 185-acre site was an open pit kyanite mine that operated from 1947 to 1970.

The site was deeded to York County in 1974 and used as a park. York County sold the property in 1982, and the site has been privately owned since that time.

Approximately 450 residences in this area rely on private wells for their drinking water. Current census data for York County indicates there are 2.72 people per household, which means approximately 1,224 people within the groundwater area are using private wells impacted by the Henry's Knob site.

In March 2000, Katawba Environmental conducted Phase I and Phase II studies of the Henry's Knob site. Samples collected during the Katawba study revealed levels of barium, chromium, cobalt, magnesium, nickel, and zinc in the site's groundwater. Of these heavy metals, cadmium and lead were above the EPA's Risk Based Concentrations (RBCs) for groundwater. Cadmium and lead were above EPA Maximum Contaminant Levels (MCLs).

Surface soil samples indicated elevated levels of arsenic, barium, chromium, copper, cobalt, magnesium, nickel, lead, zinc and mercury, with arsenic above RBCs. Surface water collected from the mine pit indicated elevated levels of chromium, copper, cobalt, magnesium, nickel, and zinc. Sediment samples collected from the pit had levels of arsenic, barium, chromium, copper, and lead that exceeded laboratory detection limits.

In August 2004, the EPA and Combustion Engineering, the potentially responsible party for cleaning up the Henry's Knob site, negotiated a formal agreement called an Agreement on Consent or AOC for the site.

Cleanup Progress: No Construction Underway As Yet

More recently, potentially responsible parties (PRPs) prepared a Remedial Investigation/
Feasibility Study Work Plan. The EPA and the South Carolina Department of Health and Environmental Control (SC DHEC) reviewed and approved the Work Plan. This approved document, dated September 23, 2005, determined the path of investigations for the site in accordance with state and federal requirements.

The overall remedial investigation (RI) was phased, and the Work Plan presented the first step of the investigation. This phase of the RI was a thorough and comprehensive sampling of soils, tailings, sediments and surface water. In April 2006, the PRPs submitted a report to EPA entitled, "Step 1 Remedial Investigation Technical Memorandum." The report contained the results of the Phase 1 investigation and outlined plans for the next phase of sampling and analysis, which will include the installation of monitoring wells and sampling of the groundwater. EPA reviewed the Step 1 report and provided comments, which will be incorporated into the PRPs' final document.

In November 2007, the PRPs submitted a "Step 2 Remedial Investigation Technical Memorandum." The report focused on residential and groundwater monitoring at the site. EPA will review the technical memorandum and provide comments to the PRPs. A public meeting will then be conducted April 17, 2008, to inform the community of its findings.

EPA also reviewed the residential well sampling data in the report and recommended that an alternate drinking water system be provided to property owners whose wells showed substances above recommended levels. The PRPs are now providing bottled water to six property owners.

For More Information

U.S. Environmental Protection Agency contacts:

U.S. EPA Region 4 Superfund Remedial & Site Evaluation Branch Sam Nunn Atlanta Federal Center 61 Forsyth Street, SW Atlanta, Georgia 30303-3014

Beverly Stepter, Remedial Project Manager

Phone: 1-800-435-9233, ext. 28816 or

404-562-8816

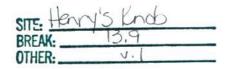
stepter.beverly@epa.gov

Linda Starks, Community Involvement Coordinator

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404-562-8487

starks.linda@epa.gov





United States Environmental Protection Agency

Henry's Knob Former Mining Site Community Information Update

Clover, York County, South Carolina

April 2008



Open Pit—Henry's Knob Former Mining Site, Clover Township, South Carolina

EPA hosts community meeting on April 17 at Bethany Elementary School

Representatives of the United States Environmental Protection Agency Region 4 (EPA), in cooperation with the South Carolina Department of Health and Environmental Control (DHEC), invite Clover area residents and others interested in the Henry's Knob Former Mining Site to a community update meeting on April 17, beginning at 7:00 p.m. at Bethany Elementary School, 337 Maynard Grayson Road, in Clover.

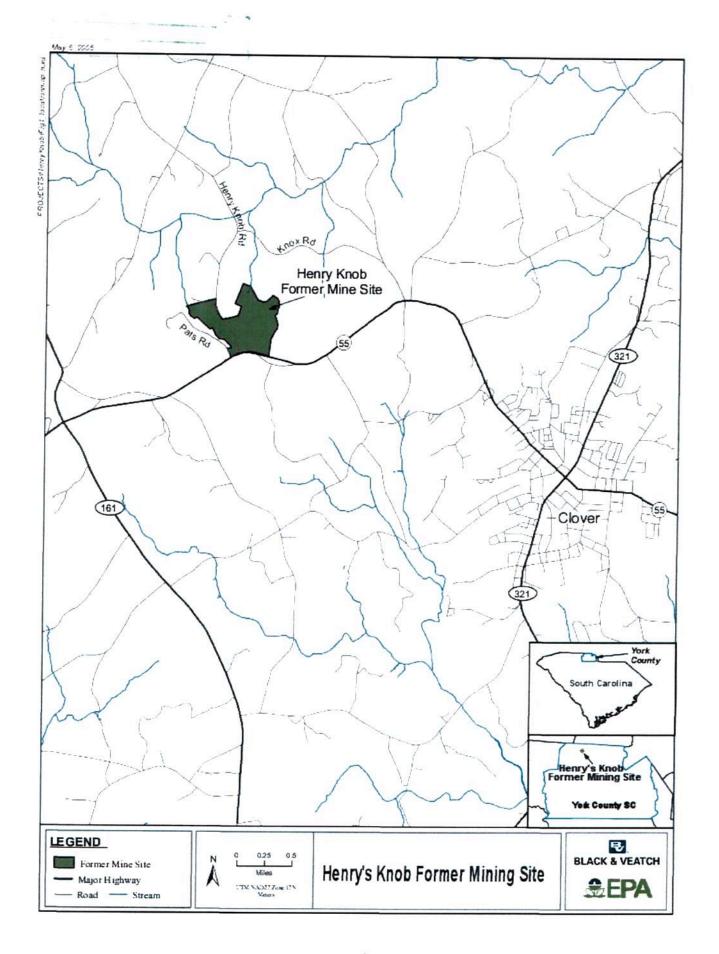
The meeting agenda includes an overview of site activities, such as the cleanup process, schedule, and community involvement opportunities, as well as recent site investigation results and next steps. Everyone is welcome.

Community interviews held in March; EPA listens to residents' concerns

EPA representatives visited the Clover area in March 2008 to view site conditions, interview a cross-section of local residents about their interest in the Henry's Knob site, and to hear any concerns they may have about past, present, or future site activities. In one-on-one, informal conversations with several local residents, EPA representatives became more familiar with the community around the site, concerns residents have about the site, and other community issues that affect them.

Community interviews are one way that EPA representatives become acquainted with residents in communities on or near Superfund sites.





Community Involvement—An Important Part of the Superfund Process

Community involvement is the process of engaging in dialogue and collaboration with community members. The goal of Superfund community involvement is to advocate and strengthen early and meaningful community participation during Superfund cleanups. Superfund community involvement staff strive to:



- Keep the community well informed of ongoing and planned activities.
- Encourage and enable community members to get involved.
- Listen carefully to what the community is saying.
- Take the time needed to deal with community concerns.
- Change planned actions where community comments or concerns have merit.
- Explain to the community what EPA has done and why.

These are the goals the EPA, in cooperation with DHEC, seeks to accomplish at the Henry's Knob site.

EPA Local Information Repository for the Henry's Knob Site

Clover Branch Library 107 Knox St. Clover, SC 29710

Upcoming Site Activities

ABB is now preparing its plans for Step 3 of the investigation, which will take place in the summer of this year. Step 3 will involve more surface and groundwater sampling in and around the site.

Final RI/FS Report.

ABB will conduct additional sampling to fill data gaps and complete the RI. The EPA and DHEC will comment on the draft RI report, and ABB will prepare a final report. The Final RI Report will describe site investigations and evaluate both the fate and transport of contaminants from the site and potential risks to human health and the environment posed by site contaminants.

In addition, ABB will complete a feasibility study (FS), which will identify and evaluate possible alternatives to reduce unacceptable risks associated with the Henry's Knob site. After EPA and DHEC review of the draft FS report, ABB will prepare the final report. EPA expects the Final FS Report in late 2009/early 2010.

When the RI/FS is completed, the EPA will issue a Proposed Plan to address the environmental conditions at the site. EPA also will hold a public meeting to present the plan and provide an opportunity for public comment. The EPA will hold a 30-day comment period, review all comments received, and issue a Record of Decision (ROD). The ROD is anticipated for Spring 2010.

Community members with questions or concerns about site activities are encouraged to contact any of the site representatives listed on the back page of this update, or stop by the Clover Public Library to view site documents.

For More Information

EPA Contacts

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Linda Starks

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U.S. EPA Region 4

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DHEC Contact

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Federal Remediation Section
Division of Site Assessment and Remediation
Bureau of Land and Waste Management
SC Dept. of Health and Environmental Control
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INSIDE: Community Update on the Henry's Knob Former Mining Site